

WHAT IS CLAIMED IS:

1                   1.       A method of preparing a nucleic acid array on a solid support, said  
2 method comprising:

- 3                   a) attaching a plurality of nucleic acids to said support to form an array;  
4 and  
5                   b) drying said array by exposing to a dry atmosphere for a period of at  
6 least 30 seconds.

1                   2.       A method in accordance with claim 1, wherein said attaching  
2 comprises a stepwise coupling of nucleic acid monomers to prepare a nucleic acid probe  
3 array wherein each of said probes are from 5 to 50 monomers in length and said drying  
4 comprises following at least a portion of said stepwise coupling steps with a step of  
5 exposing the array to a dry atmosphere for a period of at least 50 seconds.

1                   3.       A method in accordance with claim 2, wherein said portion is at  
2 least about 70% of said coupling steps.

1                   4.       A method in accordance with claim 2, wherein said portion is at  
2 least about 85% of said coupling steps.

1                   5.       A method in accordance with claim 2, wherein said portion is at  
2 least about 95% of said coupling steps.

1                   6.       A method in accordance with claim 1, wherein each nucleic acid  
2 occupies a separate known region of the support, said attaching step (a) further comprises:

- 3                   (i) activating a region of the support;  
4                   (ii) attaching a nucleotide to a first region, said nucleotide having a  
5 masked reactive site linked to a protecting group;  
6                   (iii) repeating steps (i) and (ii) on other regions of said support whereby  
7 each of said other regions has bound thereto another nucleotide comprising a masked  
8 reactive site link to a protecting group, wherein said another nucleotide may be the same  
9 or different from that used in step (ii);  
10                  (iv) removing the protecting group from one of the nucleotides bound to  
11 one of the regions of the support to provide a region bearing a nucleotide having an  
12 unmasked reactive site;

13 (v) binding an additional nucleotide to the nucleotide with an unmasked  
14 reactive site;  
15 (vi) repeating steps (iv) and (v) on regions of the support until a desired  
16 plurality of nucleic acids is synthesized, each nucleic acid occupying separate known  
17 regions of the support;  
18 wherein at least a portion of said attaching and said binding steps are followed by  
19 drying steps wherein said solid support is exposed to a dry atmosphere for a period of at  
20 least 50 seconds.

1 7. A method in accordance with claim 1, wherein said attaching step  
2 (a) comprises the sequential steps of:

3 (i) removing a photoremovable protecting group from at least a first area  
4 of a surface of a substrate, said surface comprising immobilized nucleotides on said  
5 surface, said nucleotides capped with a photoremovable protective group, without  
6 removing a photoremovable protecting group from at least a second area of said surface;

7 (ii) simultaneously contacting said first area and said second area of said  
8 surface with a first nucleotide to couple said first nucleotide to said immobilized  
9 nucleotides in said first area, and not in said second area, said first nucleotide capped with  
10 said photoremovable protective group;

11 (iii) removing a photoremovable protecting group from at least a part of  
12 said first area of said surface and at least a part of said second area;

13 (iv) simultaneously contacting said first area and said second area of said  
14 surface with a second nucleotide to couple said second nucleotide to said immobilized  
15 nucleotides in at least a part of said first area and at least a part of said second area;

16 (v) performing additional irradiating and nucleotide contacting and  
17 coupling steps so that a matrix array of at least 100 nucleic acids having different  
18 sequences is formed on said support;

19 wherein at least a portion of said contacting steps are followed by drying steps  
20 wherein said solid support is exposed to a dry atmosphere selected from the group  
21 consisting of dry air, nitrogen, argon and mixtures thereof for a period of at least 50  
22 seconds.

1 8. A method in accordance with claim 7, wherein said portion is at  
2 least about 70% of said contacting steps.

1                   **9.**       A method in accordance with claim 7, wherein said portion is at  
2   least about 85% of said contacting steps.

1                   **10.**     A method in accordance with claim 7, wherein said portion is at  
2   least about 95% of said contacting steps.

1                   **11.**     A method in accordance with claim 9, wherein said array  
2   comprises at least 10 different nucleic acids.

1                   **12.**     A method in accordance with claim 9, wherein said array  
2   comprises at least 100 different nucleic acids.

1                   **13.**     A method in accordance with claim 9, wherein said array  
2   comprises at least 1000 different nucleic acids.

1                   **14.**     A method in accordance with claim 9, wherein said array  
2   comprises at least 10,000 different nucleic acids.

1                   **15.**     A method in accordance with claim 9, wherein said array  
2   comprises at least 100,000 different nucleic acids.

1                   **16.**     A method in accordance with claim 9, wherein each different  
2   nucleic acid is in a region having an area of less than about 1 cm<sup>2</sup>.

1                   **17.**     A method in accordance with claim 9, wherein each different  
2   nucleic acid is in a region having an area of less than about 1 mm<sup>2</sup>.